Name: _____ **ID#** _____ **Lab Section:** _____

PRE-LAB (Weight: 20 %) SHOW RELEVANT CALCULATIONS ON A SEPARATE PAGE IF NECESSARY

PART (A):

(1) The circuit of an 'ideal' transformer with primary turns N_p= …….. and secondary turns N_s=…… is connected on the secondary side to a load impedance Z_L = (….. + j …….) ohms.

For values of N_p,N_s and Z_L=Z_s **selected by you** , (choose **n** between 1.5 and 2.5)determine:

a) The transformation ratio **n** = ……..

b) The impedance 'seen' on the primary side Z_p= …… +……

(2) The above transformer and load are connected to a 60Hz voltage source whose no-load terminal voltage is V_g = 120 voltsRMS, and 'internal' impedance Z_g is 3Ω. Determine

a) The Average load power P = ……..Watts

b) The Reactive load Power Q = ……...VARs

c) The PF 'seen' by the source, PF = ……..

d) The RMS load voltage V_L= ……..volts

e) The Power efficiency η = …… %

f) The %Voltage Regulation =…….= …….%

PART (B):

(1) A balanced 60 Hz three-phase Y-Y , 3-wire system is connected to measure power using the two-wattmeter method of Figure 4.6. The line-to-line voltage is 208 voltsRMS. The positive (non-zero) readings of the wattmeters are

W_A = ……Watts and W_C = …… … Watts.

The line-current magnitude is I = …… Amps.

For values of I, W_A and W_C **selected by you** , determine

a)The total average power P = ……..Watts

b)The power-factor of the load PF = ……

c) The load impedance Z = …… ∠ … ^{o} Ohms

(2) A Δ-connected balanced load has the value Z_Δ = …….. + j …… Ohms. is connected to a balanced Y-connected source and the line-current magnitude is I = ……Amps. For values of Z_Δ and I **selected by you**, determine :

a) The impedance of an equivalent Y-connected load

Z_Y = ……+ j ……..……ohms

b) The Phase-voltage magnitude of the source

V_{ph} = ……Volts RMS